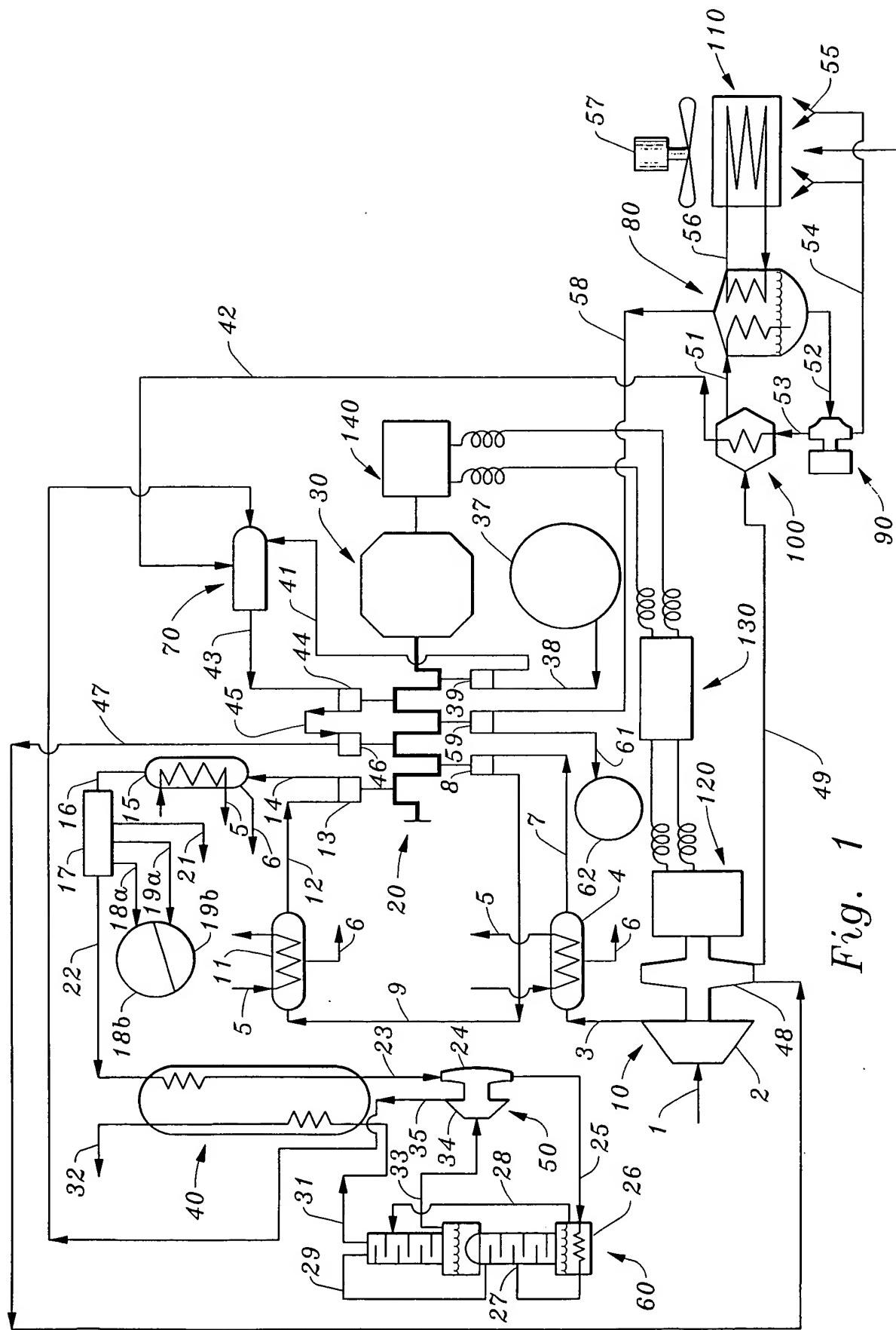


Fig. 1



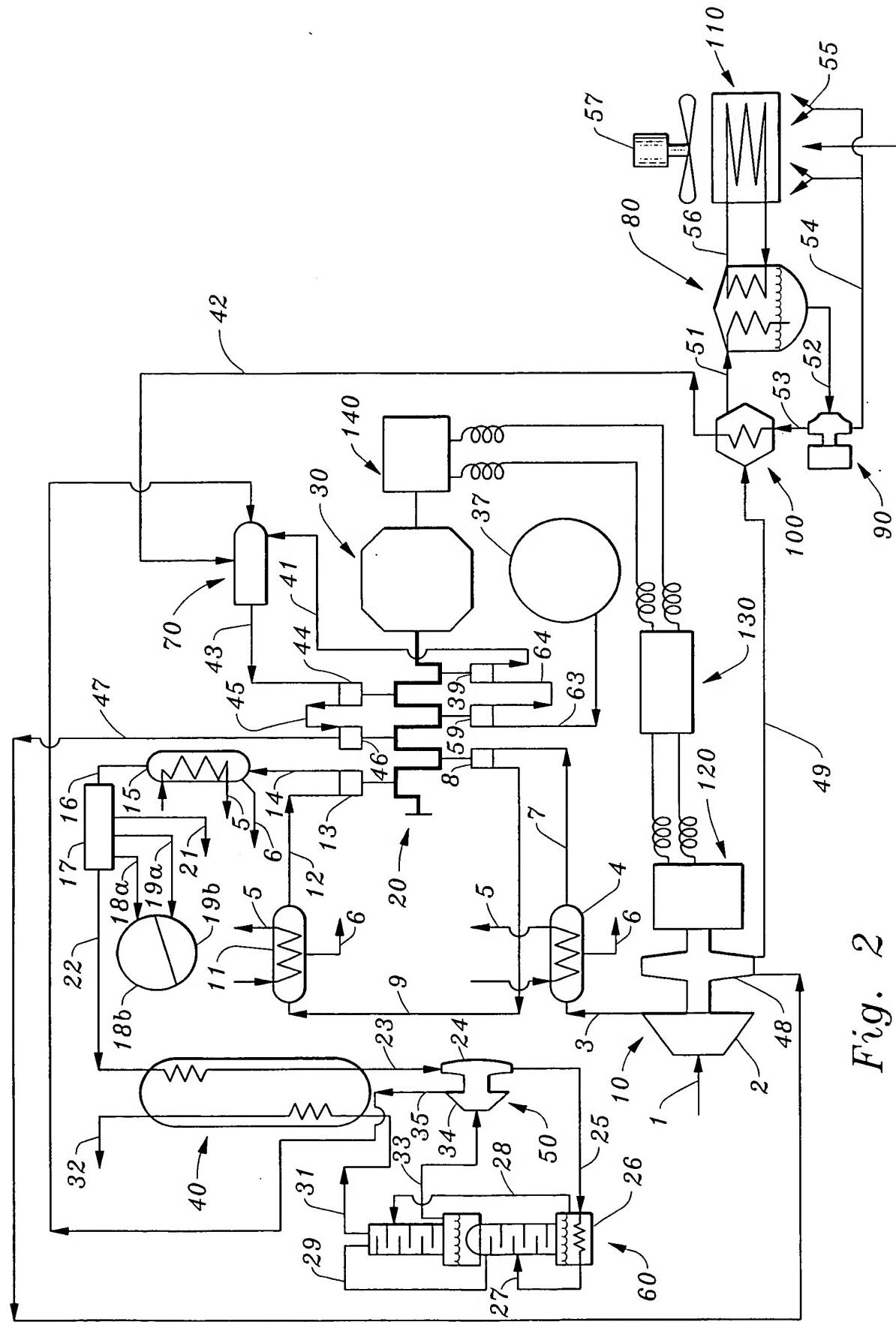


Fig. 2

Fig. 3

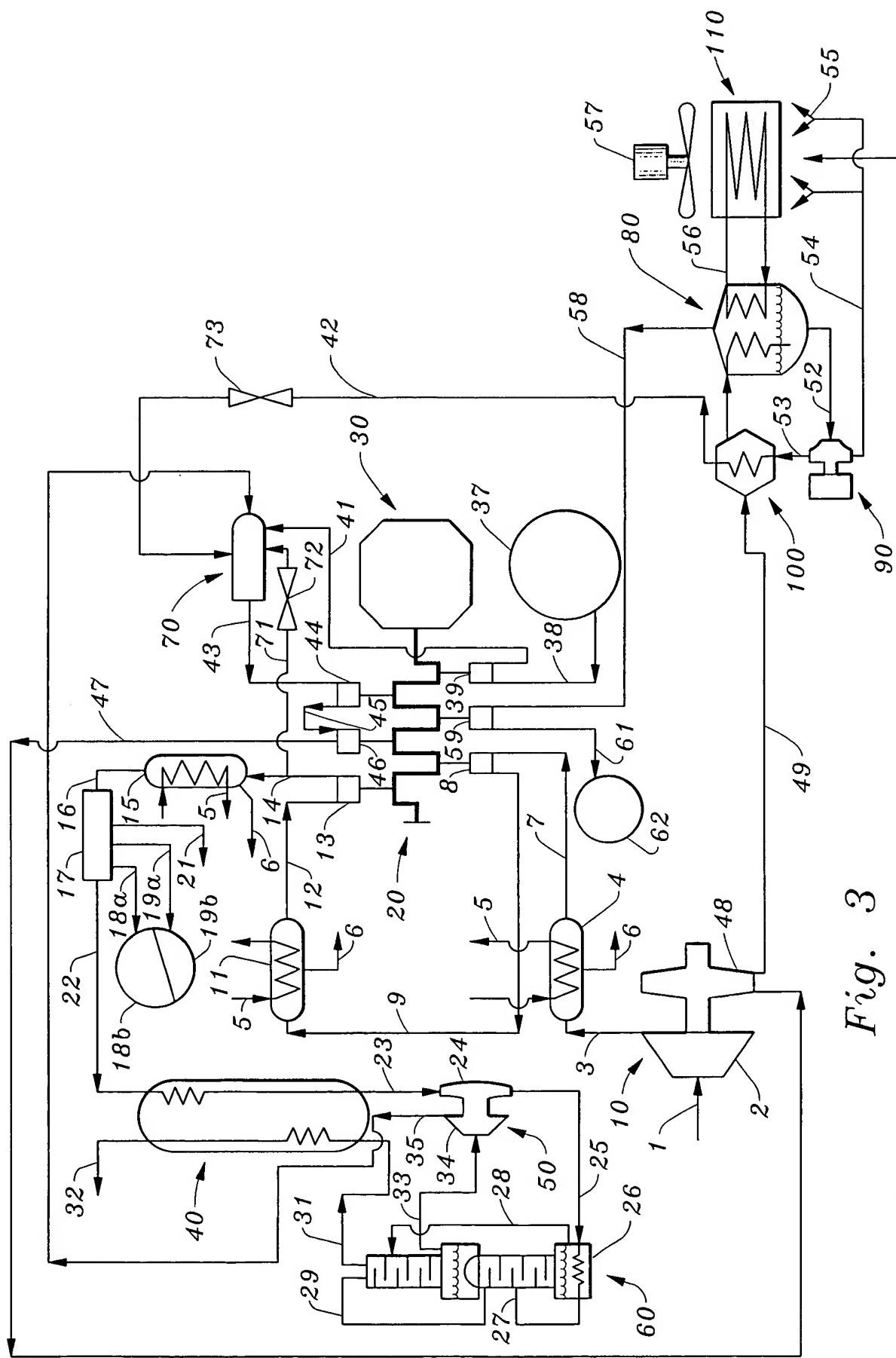


Fig. 5

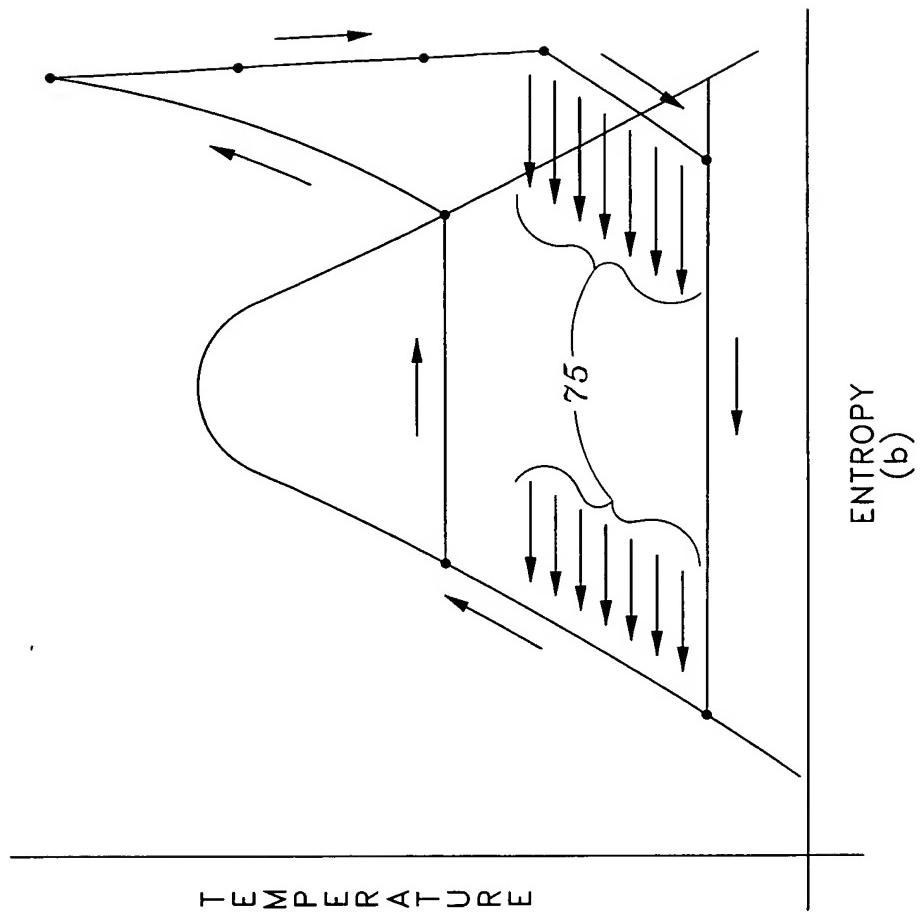
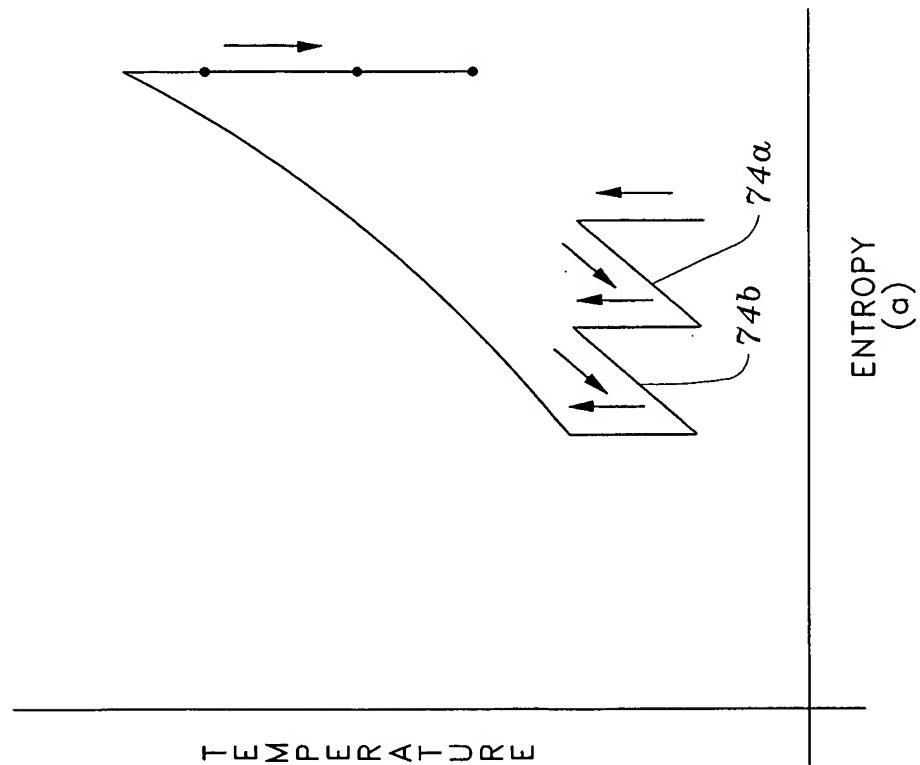


Fig. 4



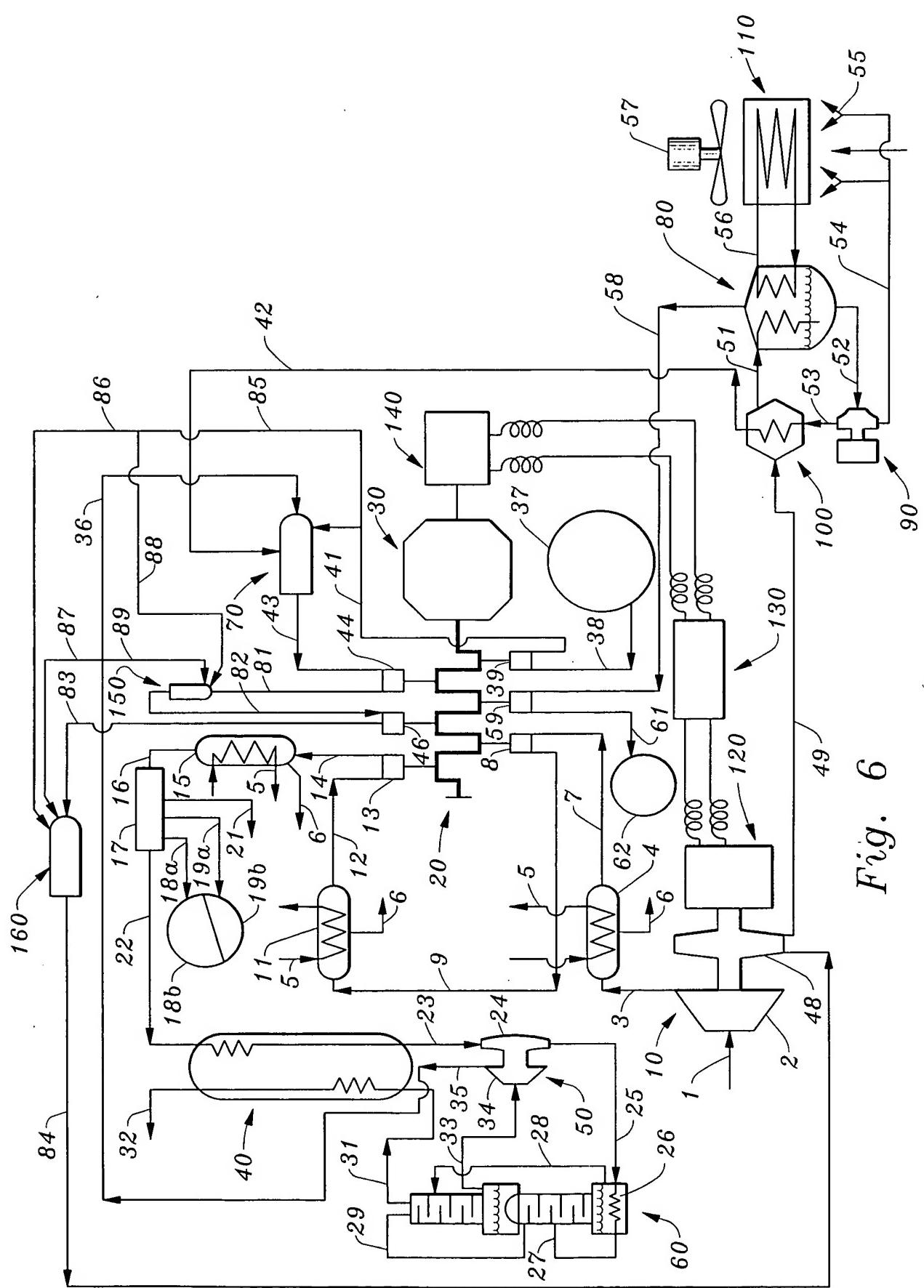


Fig. 6

Fig. 7

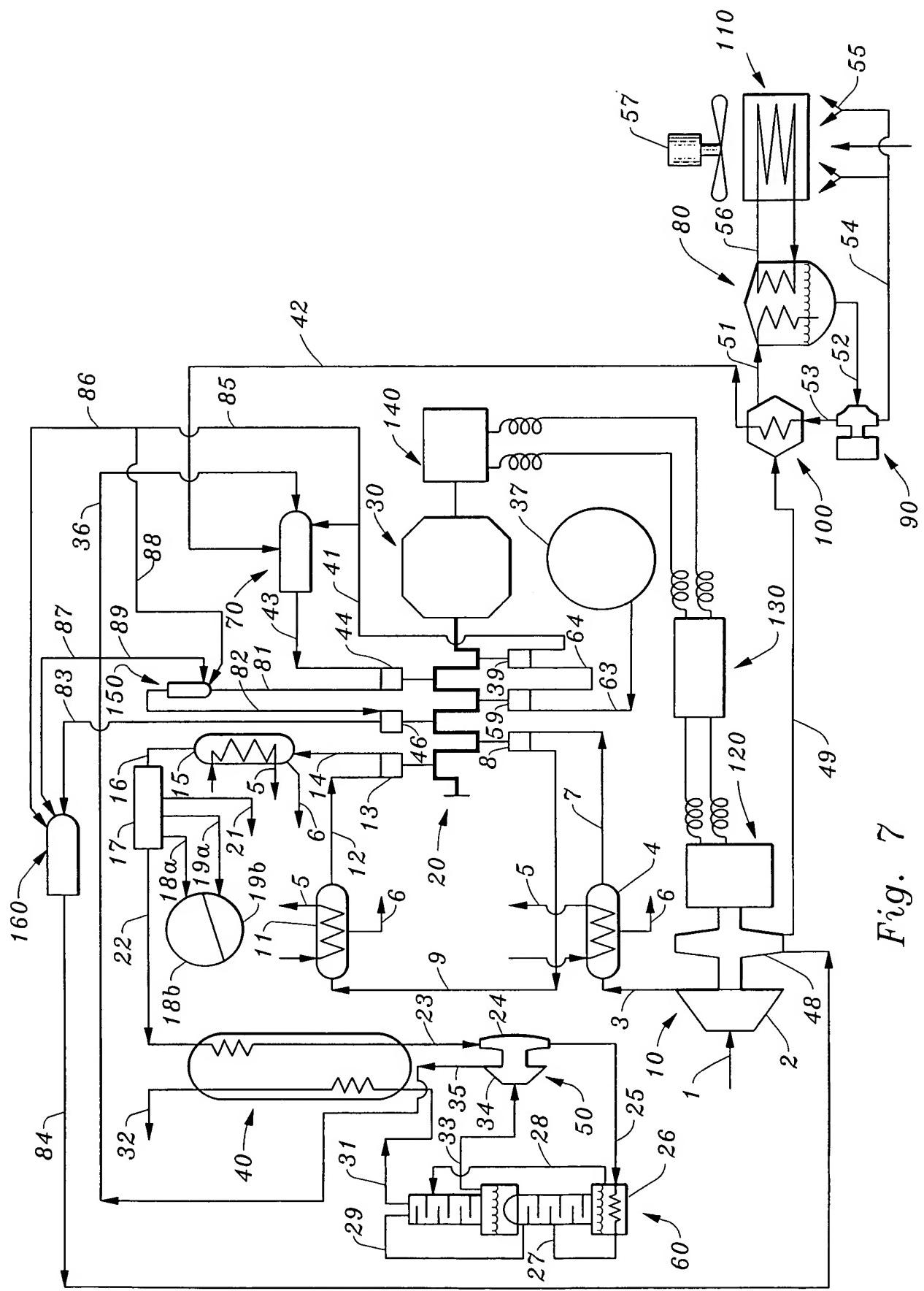
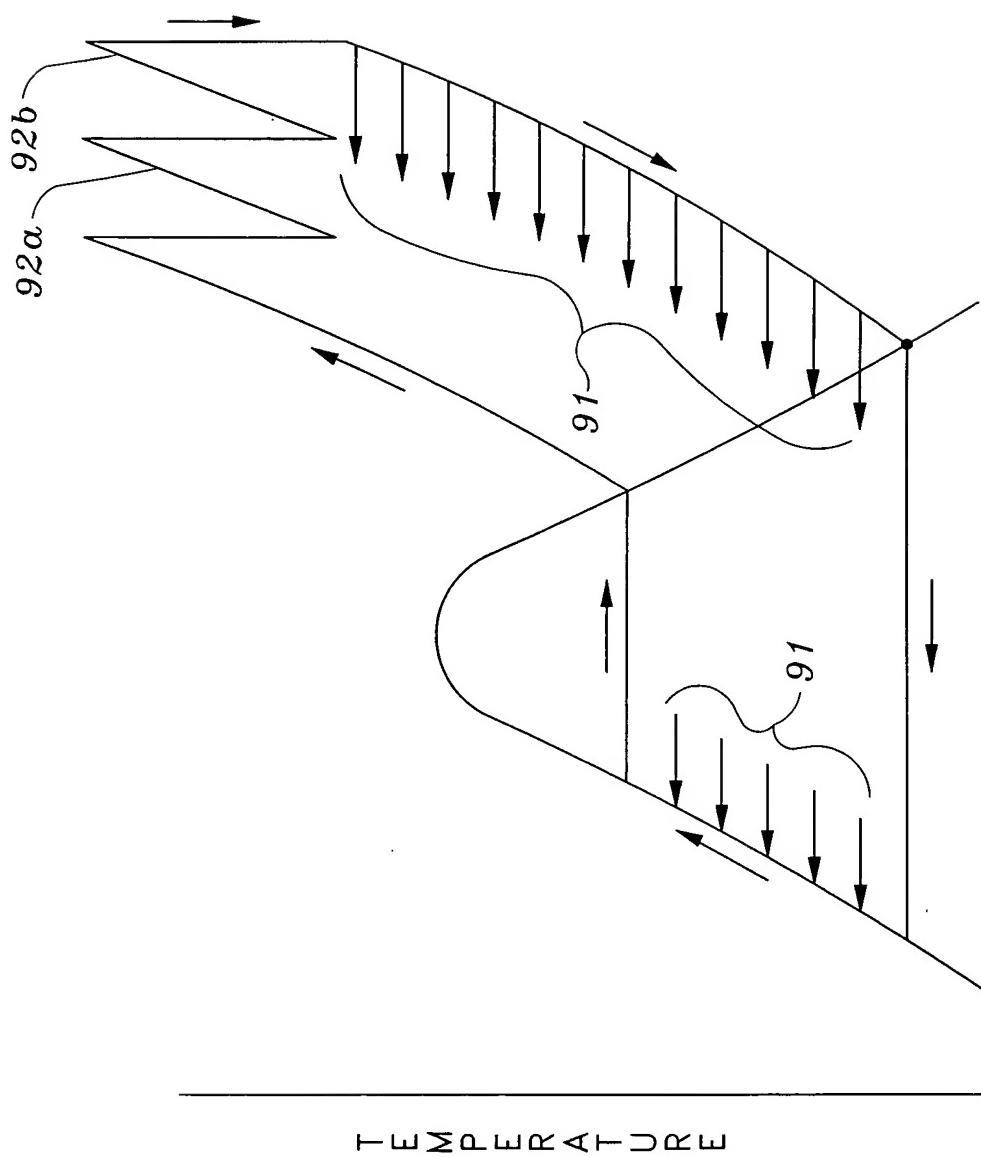


Fig. 8



TEMPERATURE

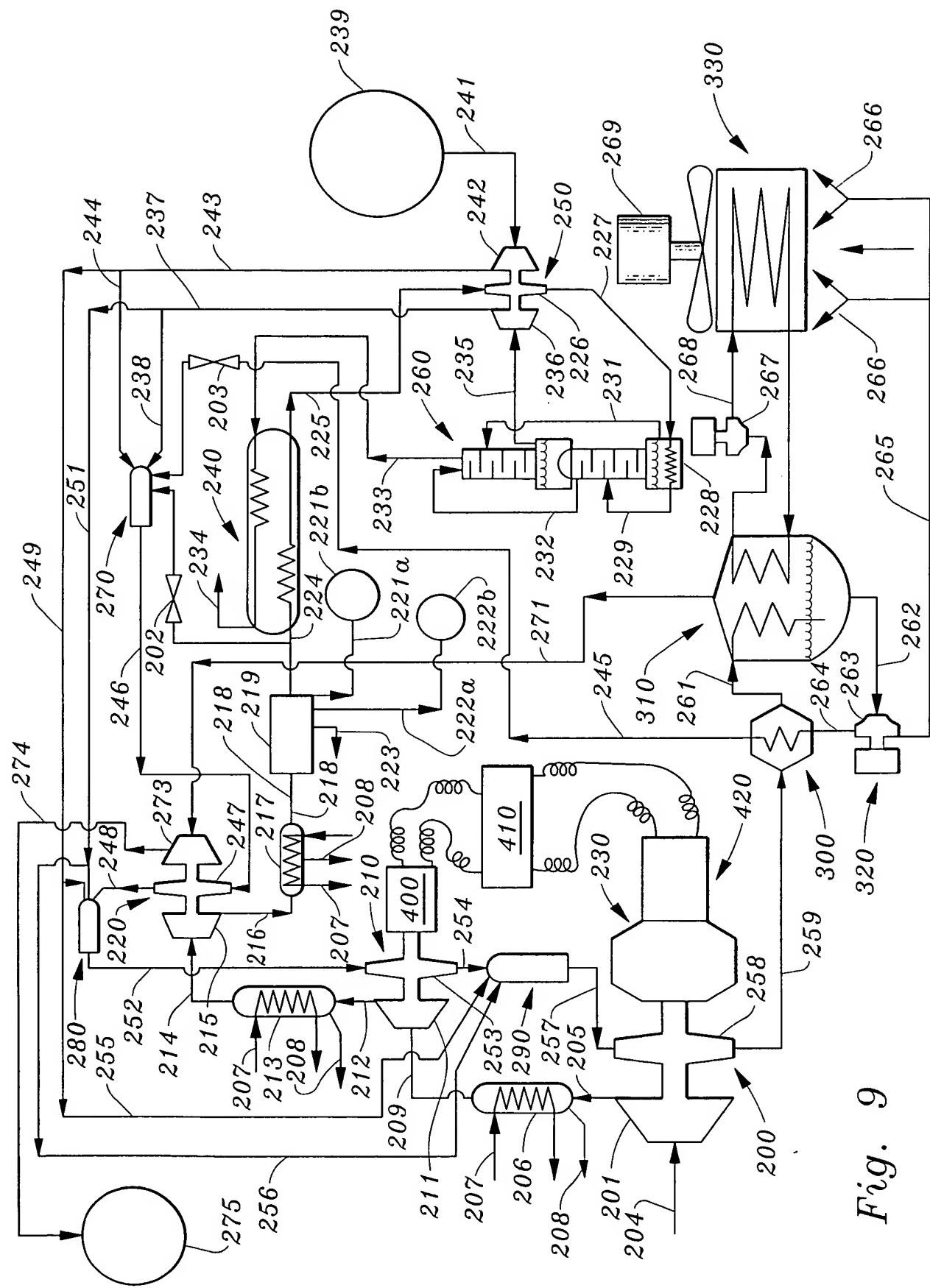


Fig. 9

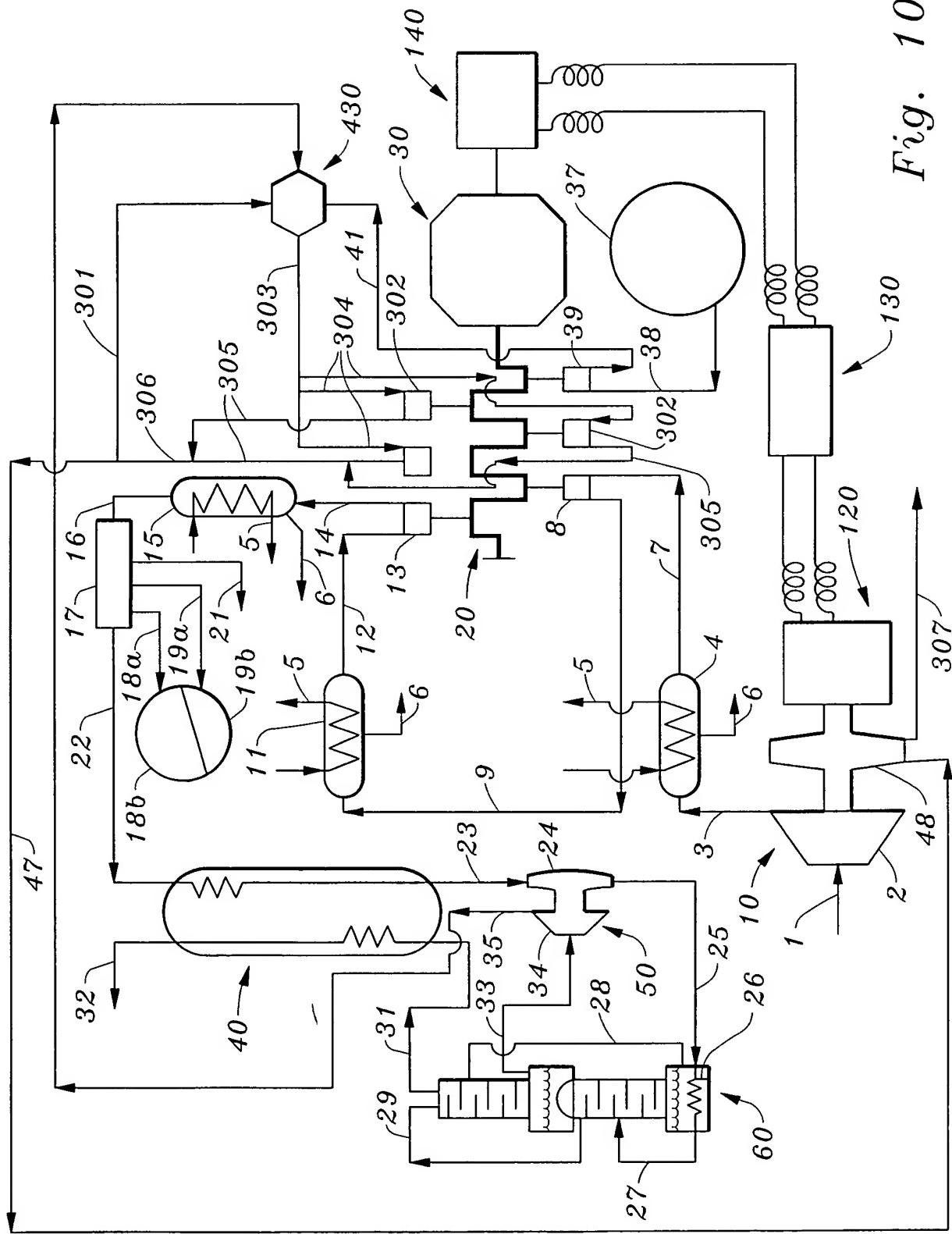
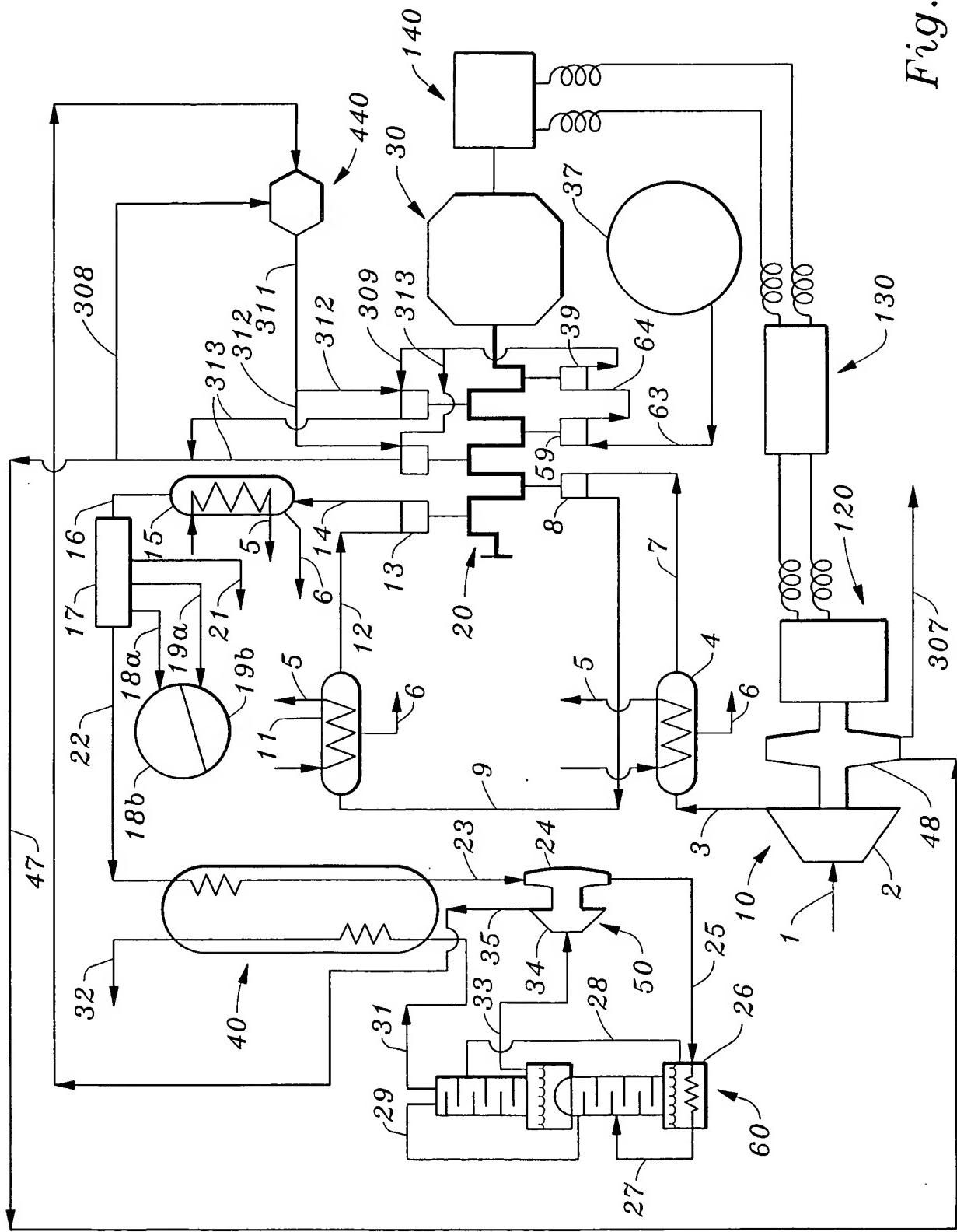


Fig. 11



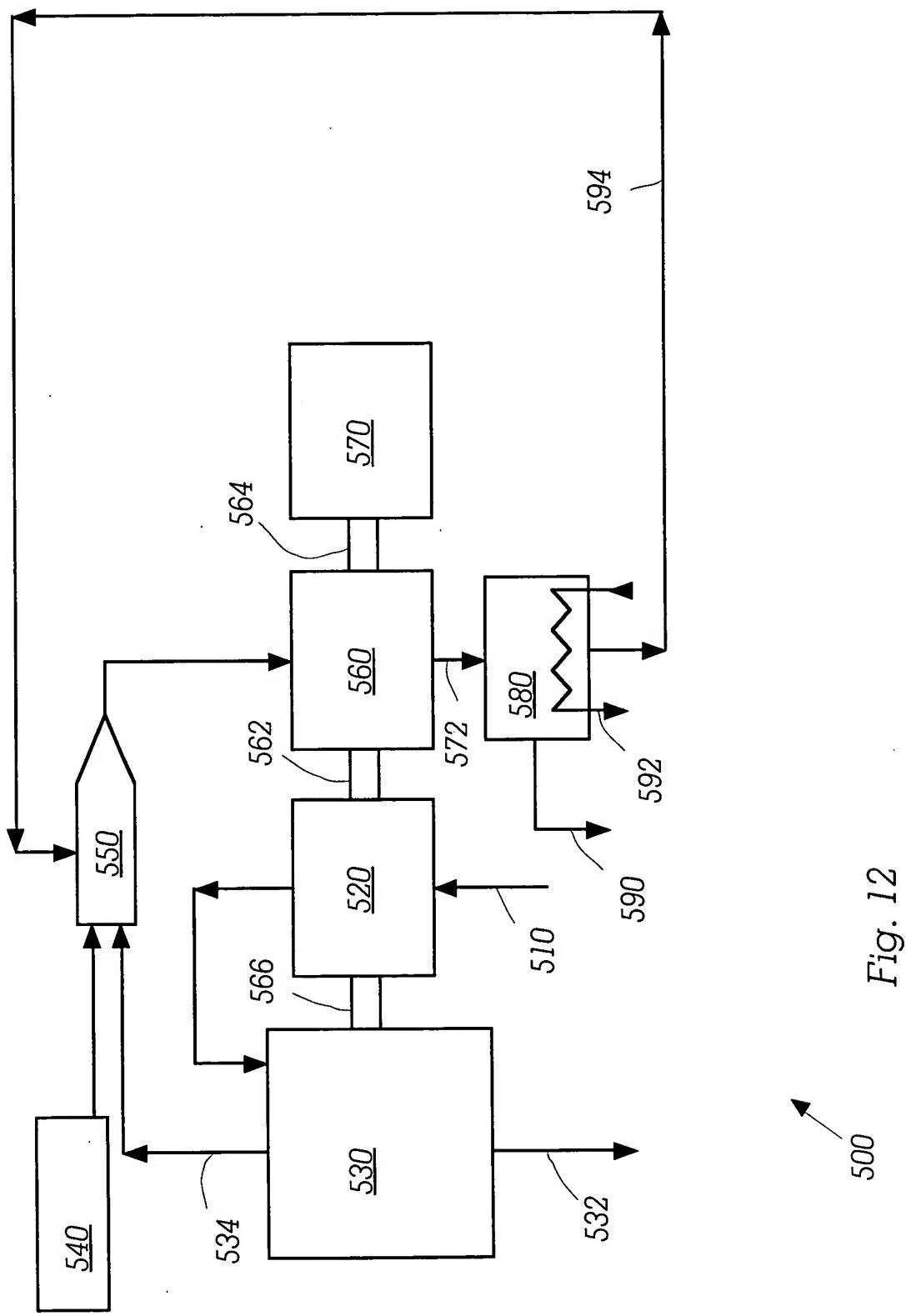


Fig. 12

500

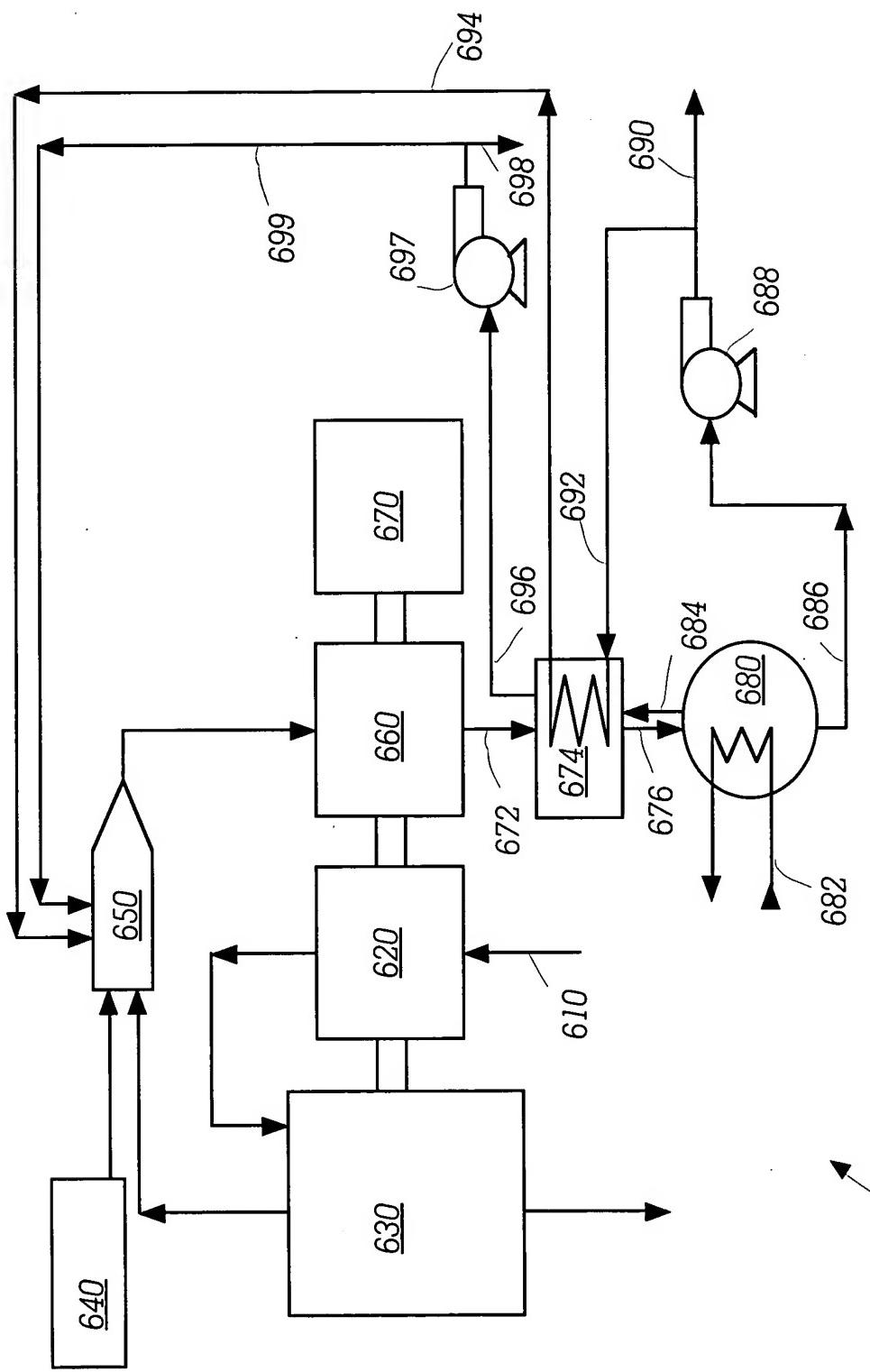


Fig. 13  
600

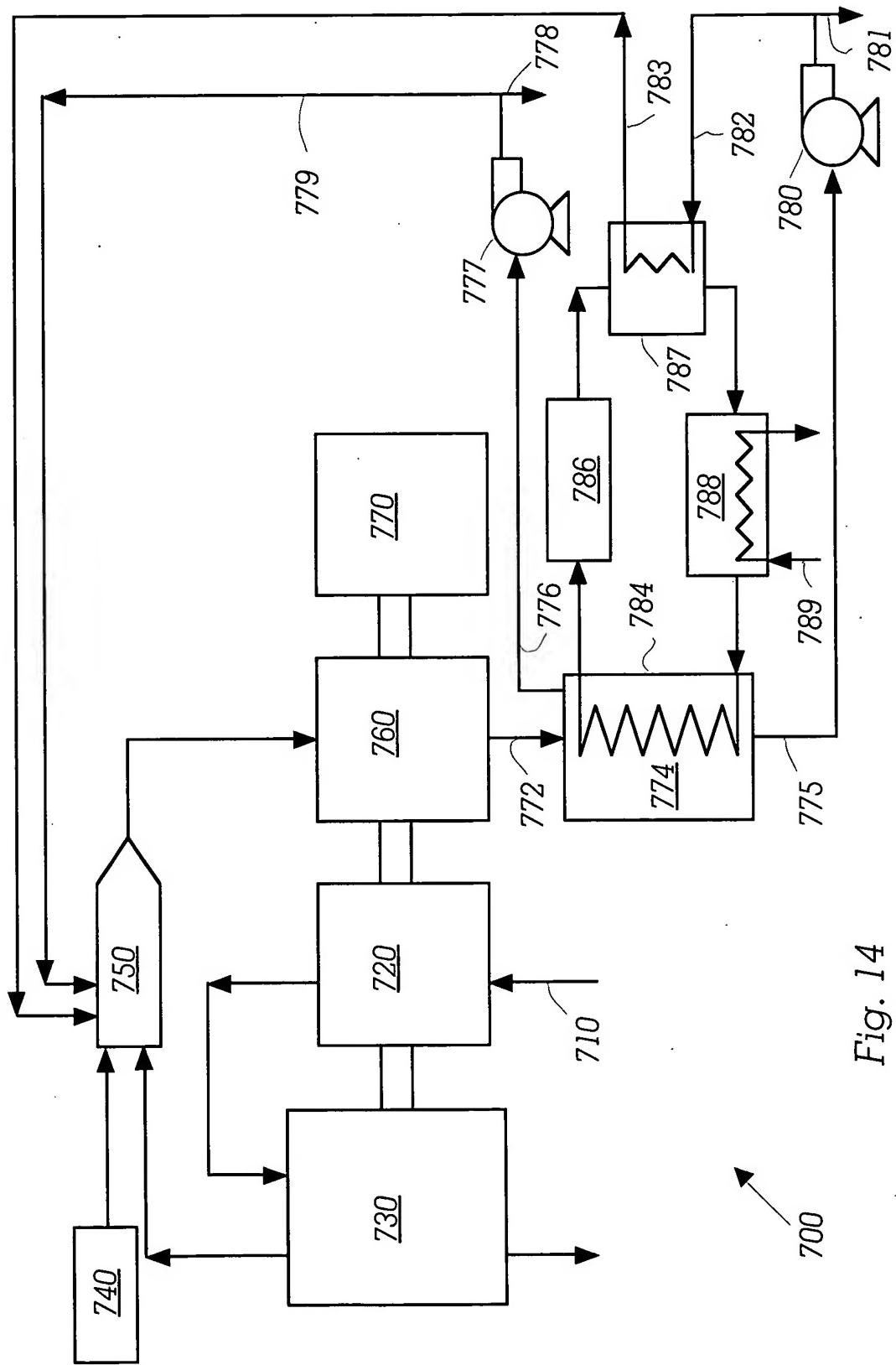


Fig. 14

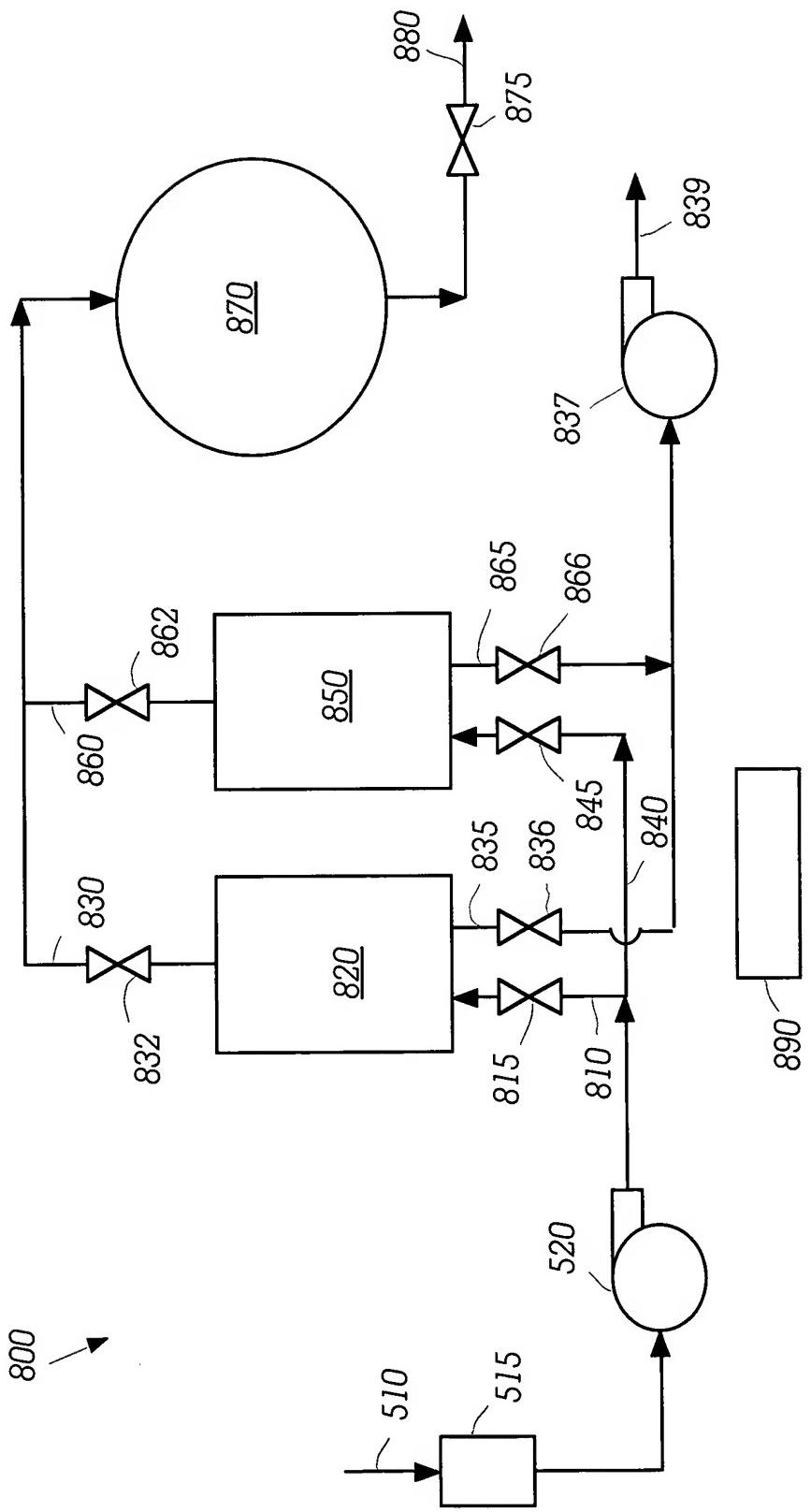


Fig. 15

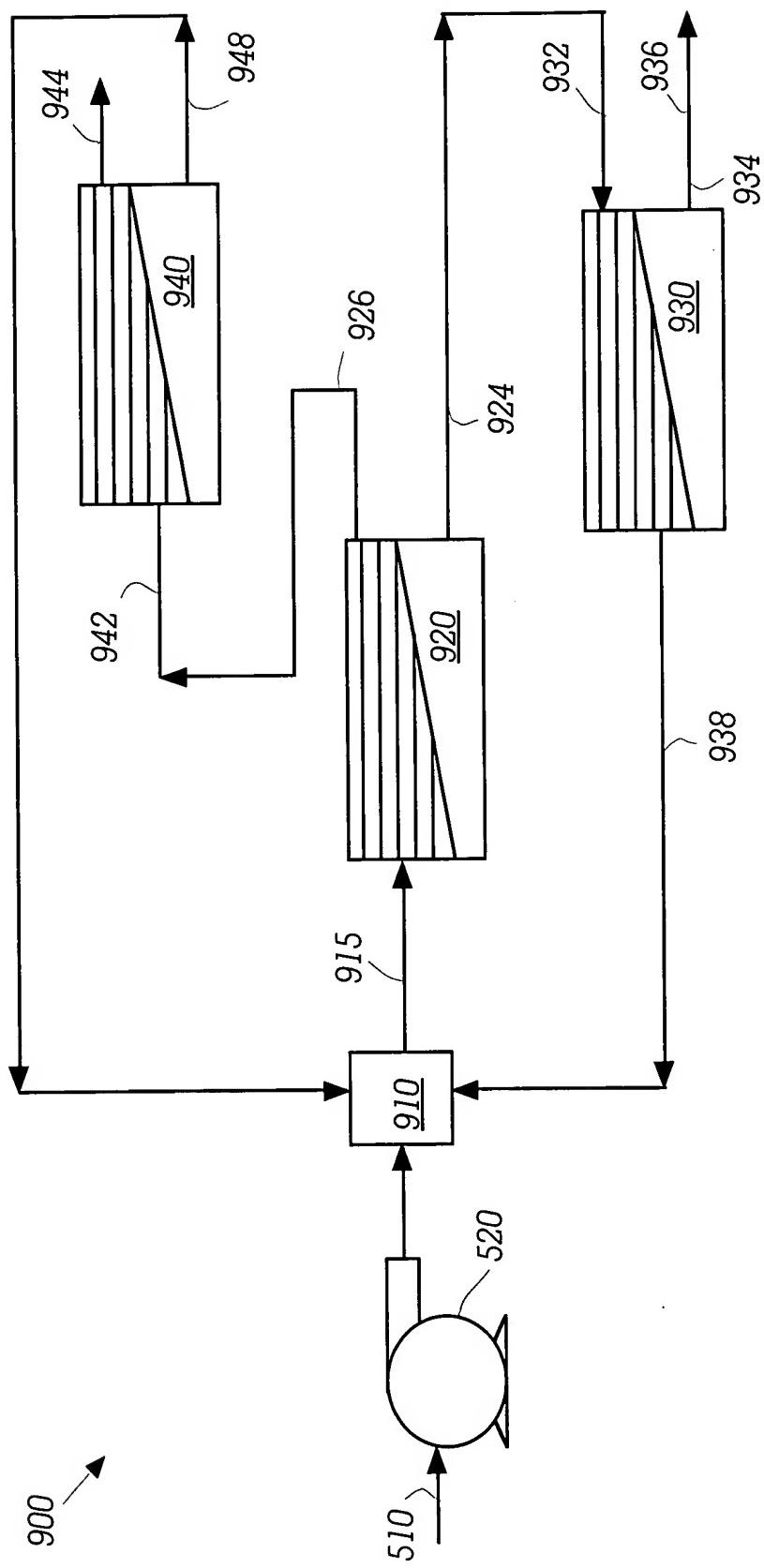


Fig. 16

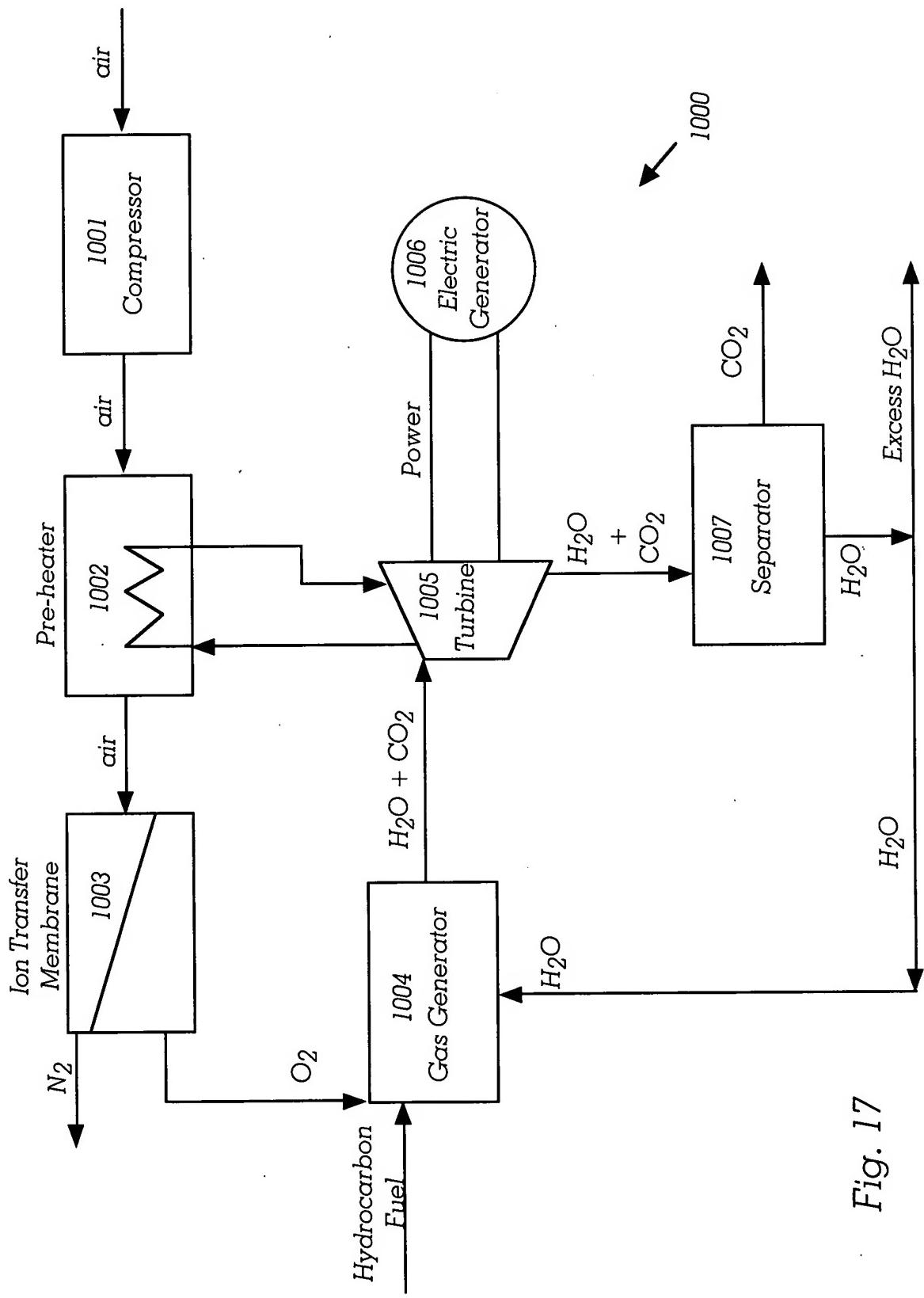
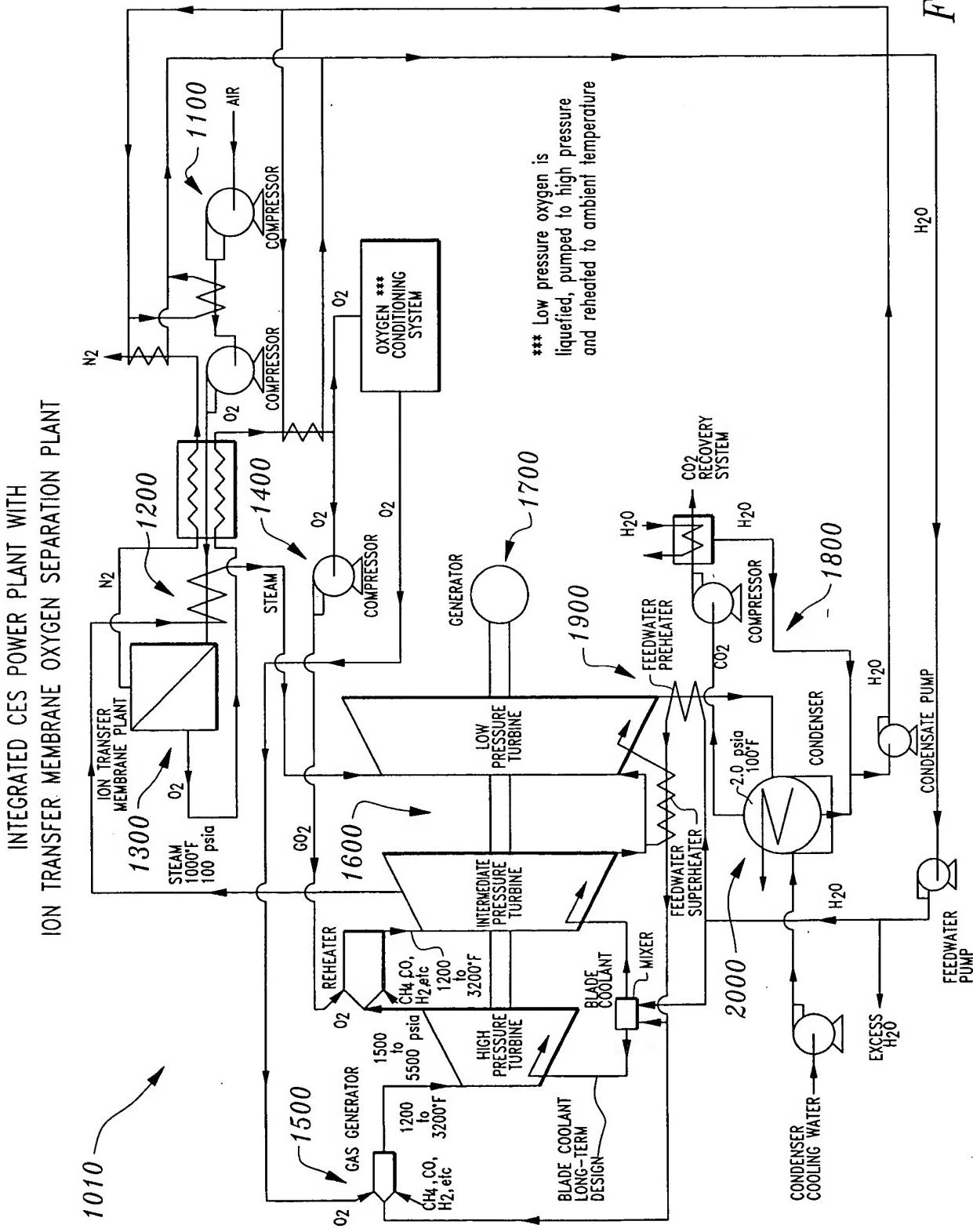


Fig. 17

Fig. 18



POWER PLANT OPERATING ON SYNGAS AND WITH ONE REHEATER

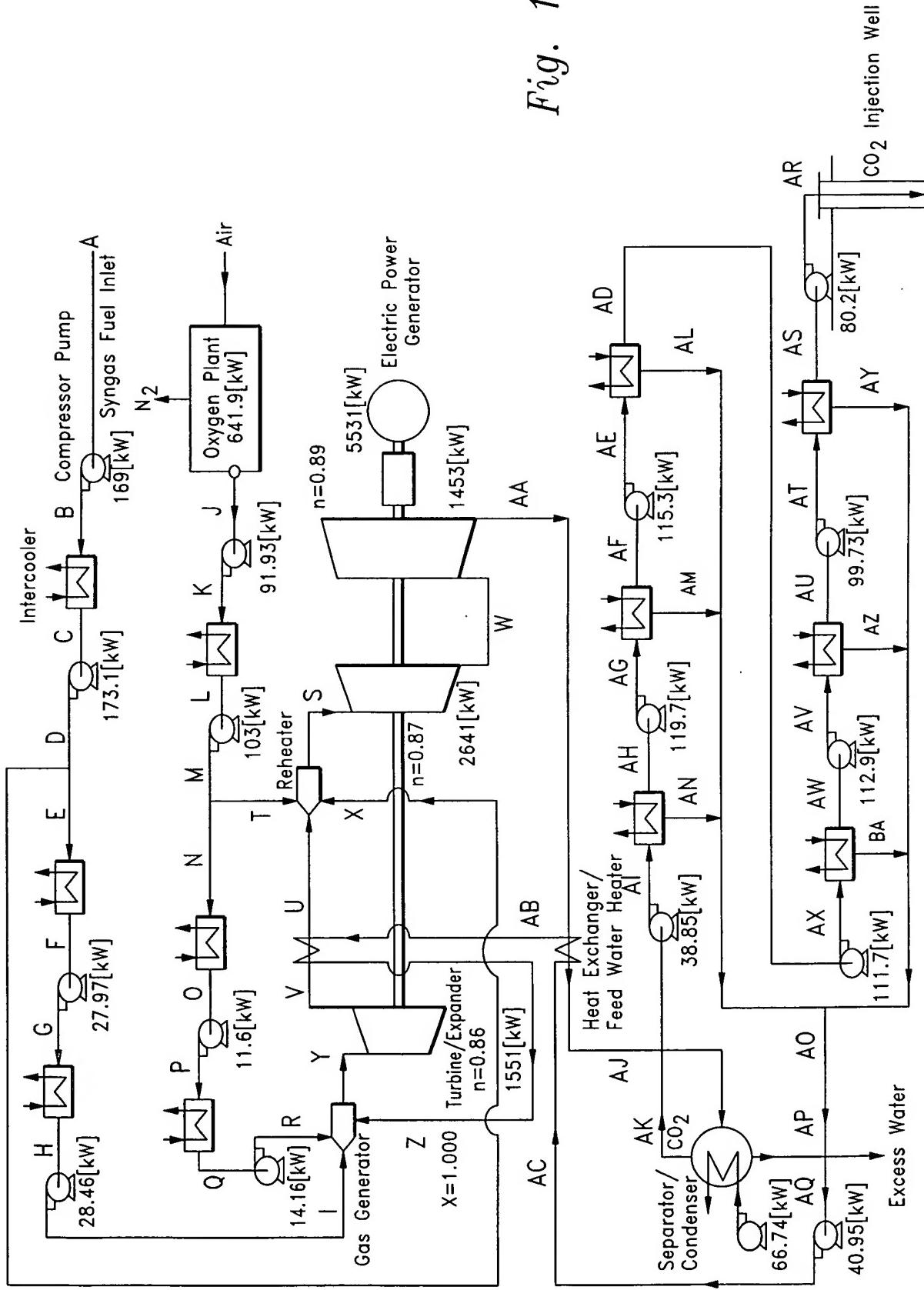
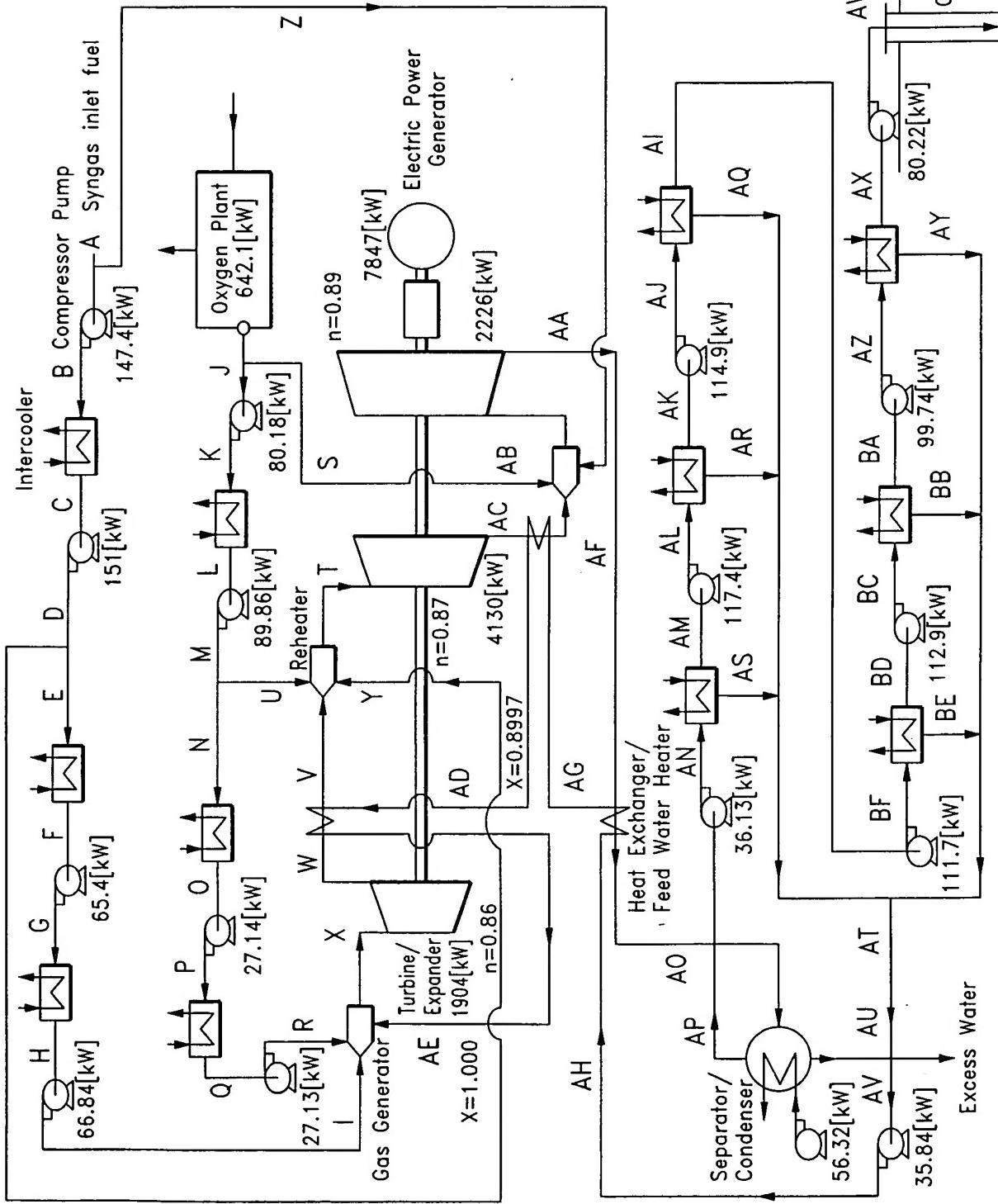


Fig. 19

POWER PLANT OPERATING ON SYNGAS AND WITH TWO REHEATERS



*Fig. 20*

CALCULATED HEATING VALUES AND FLOW RATES OF ONE TYPICAL SYN-GAS FROM A 300 TON/DAY MSW GASIFICATION SYSTEM

| Wet Basis Composition, Flow Rates, and Heating Values [1] |                        |               |                          |        |                          |             |             |
|---|------------------------|---------------|--------------------------|--------|--------------------------|-------------|-------------|
|   | Flow Rate              | Concentration | Heat of Combustion (LHV) |        | Heat of Combustion (HHV) |             |             |
| Component   | m <sup>3</sup> /hr [2] | kg · mol/hr   | kg/hr                    | %vol   | %wt                      | kJ/kg · mol | kJ/hr       |
| H <sub>2</sub>  | 3463.6                 | 141.567       | 285.38                   | 57.338 | 7.657                    | -241,826    | -34,234,736 |
| CO <sub>2</sub>   | 1067.4                 | 43.628        | 1920.05                  | 17.670 | 51.516                   | 0           | 0           |
| CO  | 995.2                  | 40.677        | 1139.37                  | 16.475 | 30.570                   | -282,989    | -11,511,081 |
| H <sub>2</sub> O  | 444.1                  | 18.152        | 327.01                   | 7.352  | 8.774                    | 0           | -44,014     |
| CH <sub>4</sub>   | 51.7                   | 2.113         | 33.90                    | 0.856  | 0.910                    | -802,320    | -1,695,405  |
| N <sub>2</sub>  | 18.3                   | 0.748         | 20.95                    | 0.303  | 0.562                    | 0           | -890,347    |
| C <sub>2</sub> H <sub>4</sub>                             | 0.4                    | 0.016         | 0.46                     | 0.007  | 0.012                    | -1,322,960  | -21,629     |
| TOTAL   | 6040.7                 | 246.901       | 3727.12                  | 100.00 | 100.00                   | -47,462,852 | -7,857.2    |
|   |                        |               |                          |        |                          |             | 13184.1kW   |
|   |                        |               |                          |        |                          |             | 15188.9kW   |

| Dry Basis Composition, Flow Rates, and Heating Values [1] |                        |               |                          |        |                          |              |             |
|---|------------------------|---------------|--------------------------|--------|--------------------------|--------------|-------------|
|   | Flow Rate              | Concentration | Heat of Combustion (LHV) |        | Heat of Combustion (HHV) |              |             |
| Component   | m <sup>3</sup> /hr [2] | kg · mol/hr   | kg/hr                    | %vol   | %wt                      | kJ/kg · mol  | kJ/hr       |
| H <sub>2</sub>  | 3463.6                 | 141.567       | 285.38                   | 61.888 | 8.393                    | -241,826     | -34,234,736 |
| CO <sub>2</sub>   | 1067.4                 | 43.628        | 1920.05                  | 19.072 | 56.470                   | 0            | 0           |
| CO  | 995.2                  | 40.677        | 1139.37                  | 17.782 | 33.510                   | -282,989     | -11,511,081 |
| CH <sub>4</sub>   | 51.7                   | 2.113         | 33.90                    | 0.924  | 0.997                    | -802,320     | -1,695,405  |
| N <sub>2</sub>  | 18.3                   | 0.748         | 20.95                    | 0.327  | 0.616                    | 0            | -890,347    |
| C <sub>2</sub> H <sub>4</sub>                             | 0.4                    | 0.016         | 0.46                     | 0.007  | 0.013                    | -1,322,960   | -21,629     |
| TOTAL   | 5596.6                 | 228.749       | 3400.11                  | 100.00 | 100.00                   | -47462851.82 | -8480.7     |
|   |                        |               |                          |        |                          |              | 13184.1kW   |
|   |                        |               |                          |        |                          |              | 14967.0kW   |

- [1] Heating values based upon assumption that all reactants and products enter and leave at 25°C and 1 atmosphere  
 [2] Normal temperature and pressure assumed to be 25°C and 1 atmosphere

Fig. 21

POWER PLANT OPERATION ON SYNGAS AND WITH ONE REHEATER  
OPERATING PARAMETERS (SEE Fig. 19)

| POSITION | PRESSURE<br>lb/in <sup>2</sup> | TEMPERATURE<br>° F | FLOW RATE<br>lb/sec. | POSITION | PRESSURE<br>lb/in <sup>2</sup> | TEMPERATURE<br>° F | FLOW RATE<br>lb/sec. |
|----------|--------------------------------|--------------------|----------------------|----------|--------------------------------|--------------------|----------------------|
| A        | 50                             | 72                 | 2.054                | AA       | 2.1                            | 192.9              | 10.51                |
| B        | 105                            | 228.5              | 2.054                | AB       | 1550                           | 151.7              | 6.674                |
| C        | 100                            | 84.77              | 2.054                | AC       | 1630                           | 109.7              | 6.674                |
| D        | 210                            | 244.5              | 2.054                | AD       | 19.7                           | 82.91              | 2.305                |
| E        | 210                            | 244.5              | 0.2283               | AE       | 20.8                           | 287.5              | 2.358                |
| F        | 200                            | 87.21              | 0.2283               | AF       | 6.3                            | 79.38              | 2.358                |
| G        | 560                            | 317.7              | 0.2283               | AG       | 6.5                            | 265.9              | 2.564                |
| H        | 532                            | 98.3               | 0.2283               | AH       | 2.3                            | 81.95              | 2.564                |
| I        | 1480                           | 245                | 0.2283               | AI       | 2.4                            | 141.1              | 3.716                |
| J        | 30                             | 72                 | 1.783                | AJ       | 2                              | 127.5              | 10.51                |
| K        | 78.8                           | 291.9              | 1.783                | AK       | 2                              | 108.3              | 3.716                |
| L        | 75                             | 94.21              | 1.783                | AL       | 19.7                           | 82.91              | 0.053                |
| M        | 210                            | 399.4              | 1.783                | AM       | 6.3                            | 79.38              | 0.2066               |
| N        | 210                            | 339.4              | 0.1982               | AN       | 2.3                            | 81.95              | 1.152                |
| O        | 200                            | 101.6              | 0.1982               | AO       | 2                              | 81.76              | 1.437                |
| P        | 560                            | 349.7              | 0.1982               | AP       | 2                              | 108.3              | 6.795                |
| Q        | 532                            | 103.2              | 0.1982               | AQ       | 2                              | 108.3              | 6.674                |
| R        | 1480                           | 404.4              | 0.1982               | AR       | 2100                           | 287.1              | 2.279                |
| S        | 170                            | 1050               | 10.51                | AS       | 644                            | 85.07              | 2.279                |
| T        | 210                            | 339.4              | 1.585                | AT       | 678                            | 301.2              | 2.281                |
| U        | 173                            | 164.7              | 7.1                  | AU       | 210                            | 94.03              | 2.281                |
| V        | 182                            | 592.5              | 7.1                  | AV       | 221                            | 308.8              | 2.288                |
| W        | 15                             | 511.9              | 10.51                | AW       | 63.2                           | 89.01              | 2.288                |
| X        | 210                            | 244.5              | 1.826                | AX       | 66.5                           | 294.6              | 2.305                |
| Y        | 1200                           | 1050               | 7.1                  | AY       | 644                            | 85.07              | 0.003                |
| Z        | 1480                           | 772.8              | 6.674                | AZ       | 210                            | 94.03              | 0.007                |
|          |                                |                    |                      | BA       | 63.2                           | 89.01              | 0.01706              |

MISCELLANEOUS OPERATING PARAMETERS

INPUT POWER = 12705 [kW] LHV  
 ELECTRICAL POWER GENERATED = 5531 [kW]  
 PARASITIC POWER = 2074 [kW]  
 NET ELECTRICAL POWER = 3458 [kW]  
 LHV THERMAL EFFICIENCY = 0.2721

*Fig. 22*

POWER PLANT OPERATION ON SYNGAS AND WITH ONE REHEATER  
OPERATING PARAMETERS (SEE Fig. 20)

| POSITION | PRESSURE<br>lb/in <sup>2</sup> | TEMPERATURE<br>° F | FLOW RATE<br>lb/sec. | POSITION | PRESSURE<br>lb/in <sup>2</sup> | TEMPERATURE<br>° F | FLOW RATE<br>lb/sec. |
|----------|--------------------------------|--------------------|----------------------|----------|--------------------------------|--------------------|----------------------|
| A        | 50                             | 72                 | 2.054                | AA       | 2.1                            | 710.4              | 9.469                |
| B        | 105                            | 228.5              | 1.791                | AB       | 14.5                           | 1200               | 9.469                |
| C        | 100                            | 84.77              | 1.791                | AC       | 15                             | 1369               | 8.978                |
| D        | 210                            | 244.5              | 1.791                | AD       | 1519                           | 598                | 5.632                |
| E        | 210                            | 244.5              | 0.5339               | AE       | 1480                           | 727                | 5.632                |
| F        | 200                            | 87.21              | 0.5339               | AF       | 14.55                          | 513.3              | 8.978                |
| G        | 560                            | 317.7              | 0.5339               | AG       | 1550                           | 498.3              | 5.632                |
| H        | 530                            | 98.3               | 0.5339               | AH       | 1630                           | 108.1              | 5.632                |
| I        | 1480                           | 245                | 0.5339               | AI       | 19.7                           | 82.59              | 2.305                |
| J        | 30                             | 72                 | 1.784                | AJ       | 20.8                           | 286.3              | 2.356                |
| K        | 78.8                           | 291.9              | 1.555                | AK       | 6.3                            | 78.5               | 2.356                |
| L        | 75                             | 94.21              | 1.555                | AL       | 6.5                            | 263.5              | 2.545                |
| M        | 210                            | 399.4              | 1.555                | AM       | 2.3                            | 80.29              | 2.545                |
| N        | 210                            | 339.4              | 0.4635               | AN       | 2.4                            | 139.3              | 3.557                |
| O        | 200                            | 101.6              | 0.4635               | AO       | 2                              | 126.9              | 9.469                |
| P        | 560                            | 349.7              | 0.4635               | AP       | 2                              | 106.6              | 3.557                |
| Q        | 530                            | 103.2              | 0.4635               | AQ       | 19.7                           | 82.59              | 0.051                |
| R        | 1480                           | 351.2              | 0.4635               | AR       | 6.3                            | 78.5               | 0.1897               |
| S        | 20                             | 72                 | 0.2284               | AS       | 2.3                            | 80.29              | 1.011                |
| T        | 170                            | 2200               | 8.978                | AT       | 2                              | 80.31              | 1.277                |
| U        | 210                            | 339.4              | 1.092                | AU       | 2                              | 106.6              | 5.913                |
| V        | 173                            | 611                | 6.629                | AV       | 2                              | 106.6              | 5.632                |
| W        | 182                            | 953.4              | 6.629                | AW       | 2100                           | 287.1              | 2.279                |
| X        | 1200                           | 1500               | 6.629                | AX       | 644                            | 85.07              | 2.279                |
| Y        | 210                            | 244.5              | 1.257                | AY       | 644                            | 85.07              | 0.003                |
| Z        | 20                             | 72                 | 0.263                | AZ       | 678                            | 301.1              | 2.282                |
|          |                                |                    |                      | BA       | 210                            | 94.01              | 2.282                |
|          |                                |                    |                      | BB       | 210                            | 94.01              | 0.007                |
|          |                                |                    |                      | BC       | 221                            | 308.7              | 2.288                |
|          |                                |                    |                      | BD       | 63.2                           | 88.92              | 2.288                |
|          |                                |                    |                      | BE       | 63.2                           | 88.92              | 0.01681              |
|          |                                |                    |                      | BF       | 66.5                           | 294.2              | 2.305                |

MISCELLANEOUS OPERATING PARAMETERS

|  |
|--|
| INPUT POWER = 12707 [kW] LHV           |
| ELECTRICAL POWER GENERATED = 7847 [kW] |
| PARASITIC POWER = 2132 [kW]            |
| NET ELECTRICAL POWER = 5715 [kW]       |
| LHV THERMAL EFFICIENCY = 0.4497        |

*Fig. 23*